Section 6 - West Colorado River Basin Management

Section 6
West Colorado River Basin - Utah State Water Plan

Management

6.1 Introduction

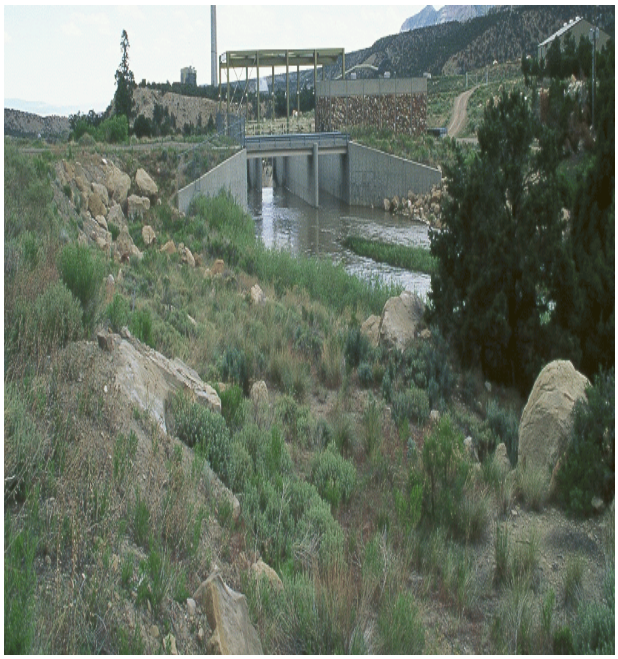
Although irrigated crop production is a major industry in the basin, increasing requirements for other uses may result in minor conflicts over use of the existing supplies. Also, some local agricultural areas in the basin, such as the Boulder area in Garfield County, are currently using 100 percent of the supply. To ease the situations, there is a need for innovative management. This section describes present water management and discusses potential management alternatives.

Water is a most valuable natural resource and often in short supply. For this reason, the management of water use is a primary concern of local water users.

6.2 Setting [61]

With the settlement of Escalante in 1875 and Carbon and Emery counties in 1877, the first water was diverted to irrigate crops. As the number of settlements increased, usually at the mouth of a canyon or near a stream, water continued to be developed, primarily for culinary and agricultural uses. Some areas were founded for other reasons, such as Green River City because of the railroad near the turn of the century. Agricultural practices have vastly improved since the early days of settlement. The modern delivery of culinary water is a far cry from carrying or hauling it in buckets or barrels from streams and ditches to the individual homes.

It soon became evident more permanent water control structures were needed to withstand the effects of floods on the various water systems. As a result, more functional facilities were installed to divert and convey water and to utilize it better. Modern pipelines are now used to convey water from wells and springs to the place of use on agricultural lands and in communities and individual homes.



Diversion structure in Emery County

Surface water storage reservoirs have been constructed on many of the rivers and streams and are an important part of the management of water delivery systems. Related benefits include flood control, water-based recreation and improved fisheries. The existing lakes and surface water storage reservoirs over 100 acre-feet in capacity are listed in Table 6-1 and shown on Figure 6-1. Many

Table 6-1
Existing Lakes and Water Storage Reservoirs (Greater Than 100 Acre-Feet)

Fig. 6-1 Number	Name	Stream	Location T	R	Capacity (ac-ft)	Surface Area (acres)	Purpose
	Price River Drainage						
1	Fairview Lakes	Gooseberry Creek	13S	5E	1949	105	I,R
2	Lower Gooseberry	Gooseberry Creek	13S	6E	212	56	R
3	Scofield	Price River	12S	7E	73,600	2,815	FC,I,R
4	Grassy Trail Reservoir	Grassy Trail Creek	14S	14E	916	29	MI
5	Horse Bench Reservoir	Dry Lake Wash	22S	15E	245	4	I
6	Olsen Reservoir	Marsing Wash	16S	11E	150	15	I
7	Desert Lake	Desert Wash	17S	10E	808	202	R
	San Rafael River Drainage						
8	Electric Lake	Huntington Creek	14S	6E	35,500	425	FC,P,R
9	Huntington Reservoir	Left Fork Huntington Creek	14S	6E	5,616	129	FC,I,R,P
10	Cleveland Reservoir	Left Fork Huntington Creek	14S	6E	5,340	185	FC,I,R,P
11	Rolfsen Reservoir	Left Fork Huntington Creek	14S	6E	900	45	FC,I,R
12	Huntington No. Reservoir	Huntington Cr (Off Stream)	17S	9E	5,690	225	FC,I,R
13	Miller Flat	Miller Flat Creek	15S	6E	5,560	160	FC,I,R,P
14	Grassy Lake	Littles Creek	17S	5E	132	11	R
15	Petes Hole Reservoir	Seely Creek (Off Stream)	18S	5E	180	50	R
16	Joes Valley Reservoir	Seely Creek	17S, 18S	6E	71,900	1,183	FC,I,MI,P, R
17	Duck Fork Reservoir	Duck Fork - Ferron Creek	19S	4E	850	48	R

Table 6-1 (Continued)
Existing Lakes and Water Storage Reservoirs (Greater Than 100 Acre-Feet)

Fig. 6-1 Number	Name	Stream	Location T	Location R	Capacity (ac-ft)	Surface Area (acres)	Purpose
18	Ferron Reservoir	Indian Creek	19S	4E	980	57	R
19	Willow Lake	Willow Creek	19S	5E	120	20	R
20	Wrigley Spring Reservoir	Slide Hollow	20S	6E	133	11	R
21	Millsite Reservoir	Ferron Creek	20S	6E	18,000	435	FC,I,MI,R
22	Buckhorn Reservoir	Buckhorn Wash	18S	10E	2,002	150	I
	Dirty Devil River Drainage						
23	Emery Reservoir	North Fork Muddy Creek	20S	4E	145	15	I
24	Spinners Reservoir	North Fork Muddy Creek	20S	4E	575	51	R
25	Julius Flat Reservoir	North Fork Muddy Creek	20S	4E	725	41	I
26	Sheep Valley Reservoir	North Creek-Ivie Creek	24S	3E	465	126	I
27	Fish Lake	Lake Creek-Fremont River	26S	2E	212,500[1]	2,500	I,R
28	Johnson Valley Reservoir	Fremont River	25S	2E	9,997	704	I,R
29	Forsyth Reservoir	UM Creek	26S	3E	3,639	171	FC,I,R
30	Mill Meadow Reservoir	Fremont River	26S	3E	5,232	156	FC,I,R
31	Donkey Reservoir	Donkey Creek	30S	4E	200	40	I
32	Fish Creek Lake	Fish Creek	30S	4E	357	27	I
33	Lower Bowns Reservoir	Pleasant Creek (Off Stream)	31S	6E	3,450	140	I,R
34	Oak Creek Reservoir	Oak Creek	31S	5E	915	38	I,R

Table 6-1 (Continued)
Existing Lakes and Water Storage Reservoirs (Greater Than 100 Acre-Feet)

Fig. 6-1 Number	Name	Stream	Location T	Location R	Capacity (ac-ft)	Surface Area (acres)	Purpose
	Escalante River Drainage						
35	Long Willow Bottom Res.	Twitchell Creek	33S	1W	100	4	R
36	North Creek Reservoir	North Creek	34S	1E	400	29	FC,I,R
37	Wide Hollow Reservoir	North Creek	35S	2E	2,324	145	I,R
38	Roundy Reservoir	Pine Creek	32S	2E	150	30	I
39	Jacobs Valley Reservoir	Pine Creek	32S	3E	1,967	359	I
40	Spectacle Lake	West Fork Boulder Creek	31S	4E	1,348	70	I,R
	Paria River Drainage						
41	Tropic Reservoir	East Fork Sevier	37S	4W	1,850	180	I,R
	Lake Powell Drainage						
42	Lake Powell	Colorado River	*		26,373,000	135,000	F,FC,I, MI,P

*Located in many sections in San Juan, Kane, Garfield counties in Utah and Coconino County, Arizona.
[1]Storage capacity is limited to 6,300 acre-feet in Fish Lake.
Purpose: FC - Flood Control I - Irrigation and Stock Watering MI - Municipal and Industrial P - Power R - Recreation/Wildlife

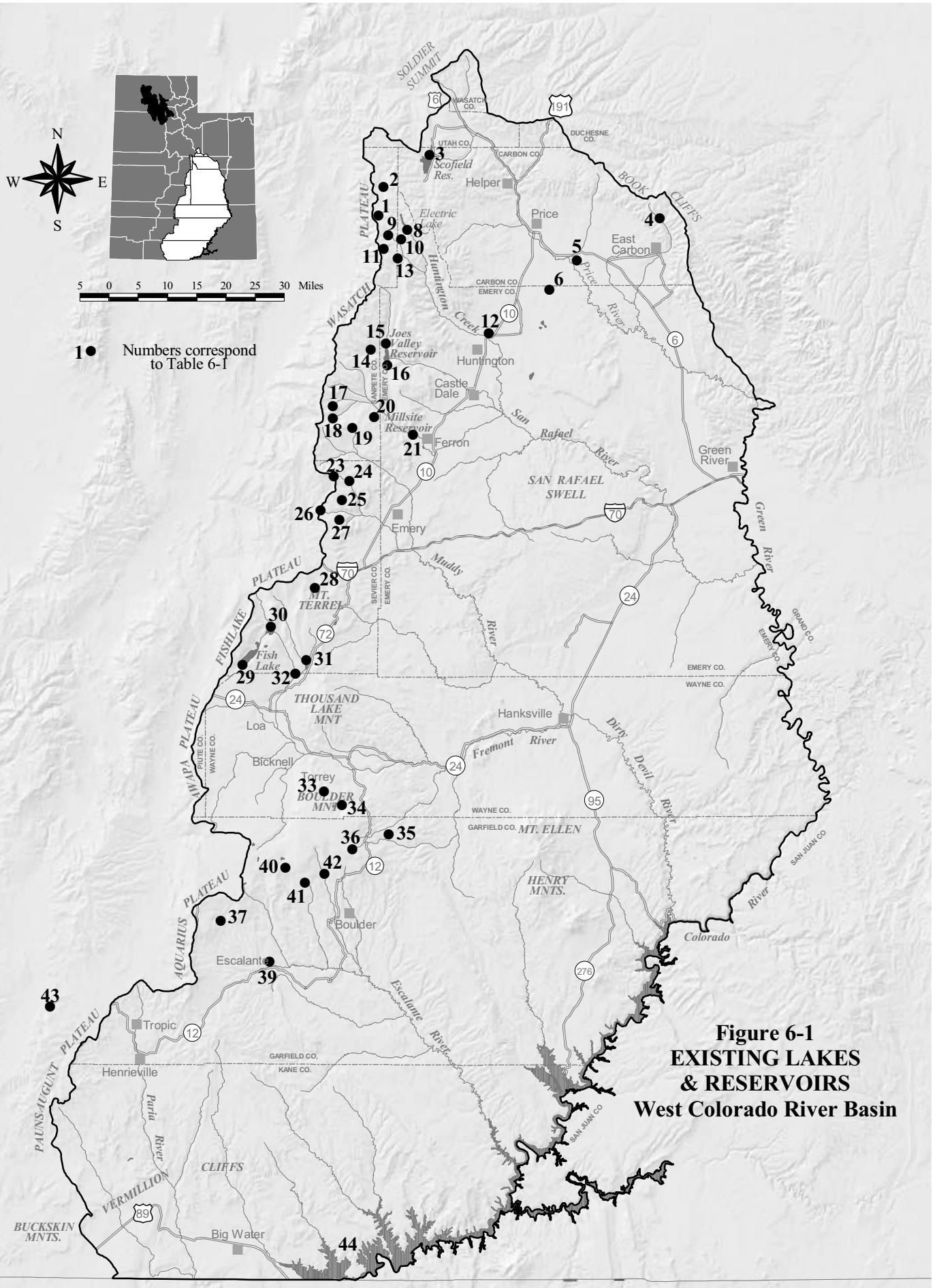


Figure 6-1
EXISTING LAKES & RESERVOIRS
West Colorado River Basin

other smaller lakes and reservoirs are located throughout the basin. Those that are used as fisheries are listed in Section 14, Table 14-2.

All water supplies are delivered and distributed according to state law by various entities that have the rights for use and distribution of this resource. This mainly deals with the quantity of water by appropriated right, but also there is increasing pressure to regulate the quality of water distributed. Quality is particularly important where water is used for culinary purposes.

6.3 Irrigation Systems

Incorporated mutual irrigation companies serve the majority of the irrigated land in the basin, while private irrigation systems serve about one-third. These irrigation companies and private systems are responsible for managing nearly 90 percent of the developed water supply. Table 6-2 lists the basin's irrigation companies along with their irrigated acreage.

6.4 Municipal and Industrial Systems [16]

The basin has 92 drinking water systems. Thirty-five are classified as "Public Community" suppliers and 57 as "Public Non-Community" suppliers (transient and non-transient). Most systems use groundwater as their sole supply source. Price River Water Improvement District, Clawson, Orangeville, Castledale, Emery, Ferron, East Carbon, Sunnyside and Green River use surface water as their principal supply.

Some industries use water that is delivered through the public water systems. Heavy industries such as mining companies and power companies use self-supplied water, treated and untreated, from municipalities and irrigation companies (see Section 18).

Water used for municipal and industrial purposes is usually well-managed. Most of the public water suppliers continue to upgrade their systems and strive to maintain an approved rating from the Department of Environmental Quality.

6.5 Management Problems and Needs

In order to properly manage the water supplies for various uses, facilities need to be maintained or replaced. This can also improve water use efficiencies. Concrete structures deteriorate with time and eventually need to be replaced. Reservoirs such as Wide Hollow and Scofield are losing capacity because of sediment.

6.5.1 Irrigation Systems

Delivery and on-farm efficiencies can be improved through proper irrigation water management and installation of sprinklers, gated pipe, canal lining, pipelines or land leveling.

6.5.2 Municipal and Industrial Systems

Management of municipal and industrial water systems is a key to the maintenance or improvement of the quality and quantity of existing supplies. Areas around springs and wells must be protected to avoid contamination. Timely maintenance of conveyance and distribution systems can reduce the volume of water lost through leaks and prevent contamination from entering culinary pipe lines. Systems should be metered as a means to save water and detect leaks.

6.6 Colorado River Salinity Control Program

In the 1960s and early 1970s, the seven Colorado River Basin states and representatives of the federal government discussed the problem of salinity levels increasing in the lower reaches of the Colorado River. The federal government enacted the Clean Water Act in 1972 while Mexico and the United States were discussing the increasing salinity of Colorado River water being delivered to Mexico. The basin states established the Colorado River Basin Salinity Control Forum in 1974 with representatives from each of the seven basin states. These representatives are appointed by the governors of the respective states for the purpose of interstate cooperation and providing the states with the information necessary to comply with the Environmental Protection Agency's (EPA) 1974 Regulation 40 CFR, Part 120, entitled, *Water Quality Standards, Colorado River System: Salinity Control*

Table 6-2
Irrigation Companies

Company	Water Right Irrigated Area (acres)
Carbon County	
Allred Ditch Company	725
Bryner Hansen Ditch Company	43
Bryner-Ploutz Ditch Company	82
Carbon Canal Company	12,555
Gay Ditch Company	82
Oberto Ditch Company	50
Pioneer Ditch Company No. 1	625
Pioneer Water Company No. 2	500
Price Canal Company	825
Price River Water Users Association	18,700
Spring Glen Canal Company	950
Stowell Mutual Water & Canal Company	175
Wellington Canal Company	3,700
Emery County	
Cottonwood Creek Consolidator Irrigation Company	15,091
Ferron Canal and Reservoir Company	14,435
Green River Canal Company	1,450
Huntington Cleveland Irrigation Company	32,957
Muddy Creek Irrigation Company	7,657
Gunnison Butte Mutual Irrigation Company	5,526
Grand County	
East Side High Ditch Irrigation Company	580
Wayne County	
Caineville Canal Company	496
Fremont Irrigation Company	10,200

Table 6-2 (Continued)
Irrigation Companies

Company	Water Right Irrigated Area (acres)
Grover Irrigation Company	800
Hanksville Canal Company	650
Chadburn/Leavitt/Hickman Company	250
Jensen & Hiskey Irrigation Company	110
Maxfield/Blackburn/Black Irrigation Company	220
Pine Creek Irrigation Company	110
Road Creek Water Users Association	700
Sand Creek Irrigation Company	260
Teasdale Irrigation Company	400
Torrey Irrigation Company	940
Garfield County	
Boulder Irrigation & Water Development Company	1,800
Cannonville Irrigation Company	271
Clifton Irrigation Company	500
Henrieville Irrigation Company	528
New Escalante Irrigation Company	2,440
Pine Creek Irrigation Company	456
Seep Ditch Company	N/A
Tropic & East Fork Irrigation Company	1,600
Wooden Shoe Ditch Company	N/A

Note: Data are not available where N/A is listed.
Source: Division of Water Rights

Policy and Standards Procedures, and Section 303(a) and (b) of the Clean Water Act.

Below Imperial Dam, salinity is controlled as a federal responsibility to meet the terms of agreement with Mexico contained in Minute No. 242 of the International Boundary and Water Commission (IBWC). Minute No. 242 requires that Colorado River water delivered to Mexico upstream from Morelos Dam will have an average annual salinity concentration no more than 115 $\pm$ 30 parts per million (ppm) total dissolved solids (TDS) higher than the average annual salinity concentration of Colorado River water arriving at Imperial Dam.

With the forum's support, Congress enacted the Colorado River Basin Salinity Control Act (P.L. 93-320) in 1974. Title I of the Act addresses the United States' commitment to Mexico and provides the means for the United States to comply with the provisions of Minute No. 242.

Title II of the act created a water quality program for salinity control in the United States. Primary responsibility for the federal program was given to the Secretary of the Interior, with the Bureau of Reclamation (BR) being instructed to investigate several salinity control units. The Secretary of Agriculture was instructed to support the program.

Under the program's original authorities, a total of 621,400 tons of salt control has been achieved. In order to meet the goal of 1.48 million tons of salinity control by 2015, it will be necessary to fund and implement potential new measures which ensure the removal of an additional 855,200 tons of salt.

To help achieve this goal, the *Price-San Rafael Rivers Unit Planning Report/Final Environmental Impact Statement* was completed in 1993. This report indicated that through improved irrigation water management and a system of on-farm and off-farm irrigation improvements, 161,000 tons of salt could be removed annually from the Colorado River system. Currently, the Huntington, Ferron, Price and Wellington irrigation areas are working with the BR through the Price-San Rafael Rivers Unit Salinity Control Program.

Although the Price-San Rafael River Unit was identified as a prime cost-effective area per ton of salt removed, any area or irrigation company in the basin can apply for assistance to the BR for a salinity control project. These requests will have to be analyzed against other identified beneficial projects throughout the basin states and will be ranked by dollars spent per tons of salt removed.

6.7 Utah's Unused Colorado River Water

The state of Utah's compact allocation of Colorado River water is 1.369 million acre-feet. The state is currently using less than 900,000 acre-feet of its compact allocation, leaving approximately 450,000 acre-feet of water available for future development within the state. With the completion of the Central Utah Project over the next 10 years, the state's use of Colorado River water will increase to about 950,000 acre-feet. This results in about 400,000 acre-feet of water being available for use within the state. The same situation exists in Colorado and Wyoming where both states have 600,000 acre-feet and 300,000 acre-feet, respectively, available for future use. Table 6-3 shows Utah's current and projected depletions of Colorado River water.

Due to restrictive federal legislation, i.e., the Endangered Species Act, the Clean Water Act, the Wild and Scenic River Act, proposed wilderness legislation, and lack of financially feasible water development projects, it will be difficult for the citizens of the state to develop all of the state's remaining compact water supply. Because of this, the state of Utah has been investigating the possibility of leasing a portion of its unused allocation (50,000 acre-feet) to one of the three lower basin states. The administration and the Utah Legislature passed a resolution in 1996 directing the Department of Natural Resources, the Division of Water Resources, the State Engineer and the Attorney General to investigate the feasibility of leasing a portion of Utah's unused Colorado River water. The unused Upper Basin water is currently going down the river and is being used free of charge by the state of California. The Lower Basin states have a 7.5 maf allocation of Colorado River water, but for the past five years have been using in excess of 8.0 maf. If Utah or the Upper Basin states could develop a revenue base from the lease of some of this unused water, revenues could be used to fund the Endangered Species Mitigation Fund and/or the financing of additional water development projects.

Table 6-3 Upper Colorado River Depletions	
	Depletions (acre-feet)
Utah Share of 6.0 Million Acre-Feet	1,369,000
Current Depletions	
State Share of Mainstem Evaporation	120,000
Agriculture	539,000
Municipal and Industrial	74,000
Exports/Imports	154,000
Subtotal	887,000
Future Depletions (Years 2000-2050)	
Agriculture	78,000
Municipal and Industrial	22,000
Exports	165,000
Ute Indian Settlement	100,000
Subtotal	335,000
Unused Remaining Supply	117,000

Utah officials continue to study the issue, but no decision has been made at this time to lease any of the state's Upper Colorado River Basin allocation.

6.8 Issues and Recommendations

The only issue discussed is real-time monitoring and control systems.

6.8.1 Real-Time Monitoring and Control Systems

Issue - Improved irrigation water management systems and methods can improve control, save water and reduce costs.

Discussion - Water is a valuable commodity as well as a finite resource. It is becoming imperative that water be managed and used to obtain the best returns possible. The cost of improving the management and use of water is considerably less than developing additional supplies. A real-time monitoring and control system is the most cost-effective means available to achieve these goals.

There is often a time lag between the need to change gate settings and the physical ability to make the adjustments. For instance, when flood flows approach diversion structures, silt and debris diverted into the canals. A solar-powered control system operated from a base station would make gate closures possible in a fraction of the time and would save a costly clean-up operation. A more sophisticated system can be installed for even better control. Instead of adjusting the gates up or down by remote control, a predetermined canal flow can be set and the gates will move automatically to maintain this flow rate.

Monitoring stations can also be established at given reaches of the river system and at critical points along the canals. This will assist the water master in making sure the canals are operating as is intended. This will allow management of the water supply to meet the requirements of the water rights. Communication is by line-of-sight radio and telephone. Repeaters would be required to maintain contact in remote areas.

The Emery Water Conservancy District's installation of real-time monitoring on Huntington and Cottonwood creeks has helped to make their water supply much more efficient. This could be critical, especially during the inevitable dry years. There will also be a savings in the cost of water management.

Recommendation - Other West Colorado River Basin water users should investigate and the Emery Water Conservancy District should continue to install solar-powered, real-time monitoring and control systems. ●